Amendments to the Drawings:

The attached sheet of drawings includes changes to Fig. 1. This sheet, which includes Fig. 1-2, replaces the original sheet including Fig. 1-2. In Fig. 1, "(PRIOR ART)" has been added.

Attachment: Replacement Sheet
Annotated Sheet Showing Changes

REMARKS

In view of both the amendments presented above and the following discussion, the Applicant submits that none of the claims now pending in the application is obvious under the provisions of 35 USC § 103. Thus, the Applicant believes that all of these claims are now in allowable form.

If, however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, the Examiner should telephone Mr. Peter L. Michaelson, Esq. at (732) 530-6671 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Specification and abstract amendments

Various amendments have been made to the specification and abstract to correct minor inadvertent grammatical, punctuation, spelling and formal errors.

Drawings

The Examiner has required the Applicant to label FIG. 1 as being "Prior Art".

In response, the Applicant now encloses herewith a red-lined drawing sheet for this figure which shows his proposed correction, i.e., the addition of the required label, in red. The Applicant now solicits the Examiner's approval of this correction. To expedite prosecution, the

Applicant has also enclosed a replacement formal drawing sheet that incorporates this correction.

Status of claims

Each of claims 21-40 has been slightly amended to correct formal and/or other minor errors and also conform the claim to proper dictates of US claim practice.

No claims have been added or deleted.

Rejections under 35 USC § 103

The Examiner has rejected claims 21-40, as they existed prior to this amendment, under the provisions of 35 USC § 103 as being obvious over the teachings in the Karlsen application (International patent application WO 97/15124 published on April 24, 1997) taken in view of the Hollier application (International patent application WO 94/00922 published on January 6, 1994). This rejection is respectfully traversed. To simplify the discussion, this rejection will be discussed principally with respect to independent claim 21.

Specifically, the Examiner opines that the Karlsen application discloses several elements of claim 21, but does not specifically teach "implementation of an objective measurement for measuring a perceptual quality of speech signals and producing an output signal, which represents an estimated value concerning talking quality". The Examiner states that implementation of objective speech quality measurements of telecommunications equipment, in order to

efficiently detect degradation of signals transmitted over communication links, was well known in the art. In that vein, the Examiner points to the Hollier application as teaching, in a similar field of endeavor as presumably the present invention, a method and apparatus that provides objective speech quality measurements of telecommunications equipment and which specifically measures a perceptual quality of speech signals and produces an output signal which represents an estimated value of the acceptability of the telecommunication equipment. Given these findings, the Examiner concludes that it would have been obvious to one of skill in the art at the time of the Applicant's invention "to modify the system taught by Karlsen to implement an objective measurement of the perceptual quality of the speech signals, as suggested by Hollier, for the purpose of detecting any degradation of the signals transmitted and thereby verifying the quality of the adaptation of the filter of Karlsen" and thus yield the Applicant's present invention. As the Examiner will soon appreciate, this conclusion is not correct.

The Karlsen application is directed to a telephone-link circuit which includes an echo-minimizing device, i.e., a dual-filter echo canceller, for reducing electrical echo caused in a four-to-two wire conversion in a PSTN/subscriber interface. As shown in FIG. 4 and described in page 7, line 7 et seq of that application, one of the filters, i.e., a background filter 12, is adaptive, the other, a foreground filter 18, is simply programmable but not adaptive. The Karlsen application specifically teaches a technique for producing two quality measures (q_a, q_p) as given by equation (4) on page 7, each of which represents the

performance of a corresponding filter in the canceller. The Karlsen application also teaches a method, using these quality measures, of selecting, for each sample n, which one of the two filters is the "best" filter and thus will then be used to perform echo cancellation, as in the embodiment shown in FIGs. 4 and 5 and discussed in page 7, line 7 et seq.

Furthermore as discussed in page 10, line 12 et seq, the Karlsen application also teaches that the filter coefficients of one of the two filters may be transferred or copied to the other filter (note bi-directional path 21 shown in FIG. 4). Under some operating conditions, such as double-talk intervals during which the adaptive filter may have diverged, it may make sense to transfer coefficients from the programmable filter to the adaptive filter to eliminate the divergence. Other conditions, such as where the adaptive filter is producing results that are consistently better than the programmable filter, may suggest transferring coefficients from the adaptive filter to the programmable filter. With this in mind, the quality measures can also be used, pursuant to the embodiment shown in FIG. 7 and discussed in page 10, line 27 et seq, in determining whether to transfer filter coefficients or not between the two filters, and, if so, then in what direction, i.e., from which filter to the other.

Each quality measure (q_i, where i = a or p) is a function of a signal which is a signal combination of an echo signal (s(n)) of a *far-end speech signal* (x(n); see page 4, lines 7-10) and a signal (v(n)) which represents *near-end noise and speech* (see equations (4) and (5) on page 7). Each quality measure is then applied, as input, to decision

logic 24 to decide whether the echo cancelling signal of then adaptive filter or of the programmable filter is used for echo cancellation (see page 7, lines 7-20), and to determine coefficient transfer.

The Hollier application discloses a test apparatus (specifically apparatus 4 as shown in FIG. 1) which supplies a speech-like test signal to input 2 of telecommunications equipment 1 to be tested. This apparatus then receives a corresponding distorted test signal from output 3 of the equipment, and determines a difference in perceptibility ('to a human listener') of the distorted test signal with respect to a corresponding original test signal. As shown in FIG. 2 and discussed in page 7, line 21 et seq, test apparatus 4 includes signal generator 7 and signal analyzer 8. the signal generator supplies the speech-like signal, while the signal analyzer analyzes the signal received from the equipment under test. As noted in page 11, line 21 et seq, the analyzer produces an "acceptability" output signal which reflects the distortion of the test signal as perceived by a human listener (given the response of the human ear as then understood and modelled). See page 13, lines 19-26.

As such, the analyzer taught by the Hollier application models the perceptual properties of the human hearing and may predict *a listening quality of a one-way speech signal* through the telecommunications equipment under test. In that sense, this technique is equivalent to, and has the same shortcomings as the prior art of references [3] and [4], which are discussed in the Introductory part of the present application at page 2, lines 6-16, and page 4, lines 1-5.

In sharp contrast to the teachings of the Karlsen and Hollier applications, the present invention is directed to measuring a so-called *talking quality* of a telephone link in a telecommunications network, i.e., the influence of echo on the perceptual quality *on the talker's side* of that link. See, page 2, line 37 through page 3, line 2.

To do so and as the present Applicant teaches, a talker speech signal s(t) and a combined signal ((s'(t)) are fed to an objective measurement device, such as PSQM (perceptual speech quality measurement) system 32 shown in FIG. 3 of the present application, for obtaining an output signal (q(t)) that represents an estimated value of the *perceptual talking quality*. The combined signal is a combination of a returned signal (r(t)) originating from the network, corresponding to the talker speech signal, and the talker speech signal (s(t)) itself. The returned signal may include various kinds of echo signals which may occur in a return channel of the telephone link and caused by the talker speech signal in the forward channel of the link.

The resulting output signal (q(t)), which represents an estimate of the perceptual talking quality, may then be used to control an echo-minimizing device, as is typically included within an established telephone link. See, e.g., page 7, lines 37-39.

Both the Karlsen and Hollier applications are utterly devoid of any teachings regarding measuring talking quality as defined in the present application, i.e., for measuring the influence of echo on the perceptual quality *on the talker's side* of a telephone link. In that regard, the

neither the Karlsen nor the Hollier applications teaches combining speech and returned signals in the same or even a similar manner as taught by the present invention.

In addition, the Karlsen and the Hollier applications do not contain any incentives to apply a perceptual speech quality measurement for minimizing echo, let alone in the manner taught by the present invention.

Hence, any combination of the teachings of these two applied prior art applications would yield an approach for providing a quality measure of the signal, produced by a communication system under test, for the listener's side, but not the talker's side. Thus, one of skill in the art when faced with the problem, as the Applicant was, of estimating *talking quality* would not be motivated to consider the teachings of the Karlsen and Hollier patents, let alone combine them in the manner posed by the Examiner. Now, even if that person of skill were, for some reason, to combine those teachings, then, contrary to the Examiner's view, the resulting approach would lead directly away from the Applicant's present invention, not towards it; hence negating any finding that the present invention would be obvious in view of those combined teachings.

Claim 21, as it currently stands and as provided immediately below, contains suitable recitations directed to the distinguishing aspects of the present invention, with those recitations being indicated by a bolded typeface:

> "A method for measuring **talking quality of a telephone link** in a telecommunications network, comprising the steps of:
>
> **combining a talker speech signal (s(t)) and a returned signal (r(t)), which occurred in a return channel of the telephone link as a consequence of the transmission of the talker speech signal in a forward channel of the telephone link, to yield a combined speech signal (s'(t)); and**
>
> **subjecting the combined speech signal with respect to the talker speech signal to an objective measurement technique for measuring perceptual quality of speech signals**; and
>
> producing an output signal (q(t)) which represents an estimated value of the talking quality." [emphasis added]

The Applicant submits that claim 21 is not rendered obvious by the teachings of the Karlsen and Hollier applications, regardless of whether those teachings are taken singly or in any combination including that posed by the Examiner.

Each of the Applicant's dependent claims 22-31 depends, either directly or indirectly, from independent claim 21 and recites further distinguishing features of the present invention over those recited in that independent claim. Accordingly, the Applicant submits that none of these dependent claims is rendered obvious by the teachings of these two applied references for the same exact reasons set forth above with respect to claim 21. Consequently, each of these dependent claims is also patentable under the provisions of 35 USC § 103.

Further, each of the Applicant's two other independent claims, namely apparatus claims 32 and 37, contain very similar and parallel limitations to those in claim 21, though couched in apparatus form.

Therefore, each of these two independent claims is also patentable over the two applied references for the same reasons discussed above for claim 21.

Each of dependent claims 33-36 and 38-40 depends, either directly or indirectly, from claims 32 and 37, respectively, and recites further distinguishing aspects of the present invention than those recited in its corresponding independent claim. Accordingly, the Applicant submits that none of these dependent claims is rendered obvious by the teachings of these two applied references for the same exact reasons set forth above with respect to claim 21. Consequently, each of these dependent claims is also patentable under the provisions of 35 USC § 103.

Conclusion

Thus, the Applicant submits that none of the claims, presently in the application, is obvious under the provisions of 35 USC § 103.

Consequently, the Applicant believes that all these claims are presently in condition for allowance.

Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

Respectfully submitted,

January 11, 2006

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CERTIFICATE OF MAILING under 37 C.F.R. 1.8(a)

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30,090
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(PTT133AMEND/ca:166)

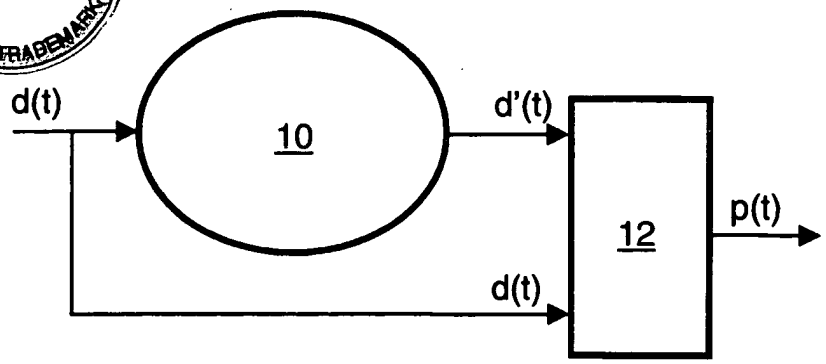

FIG. 1 (PRIOR ART)

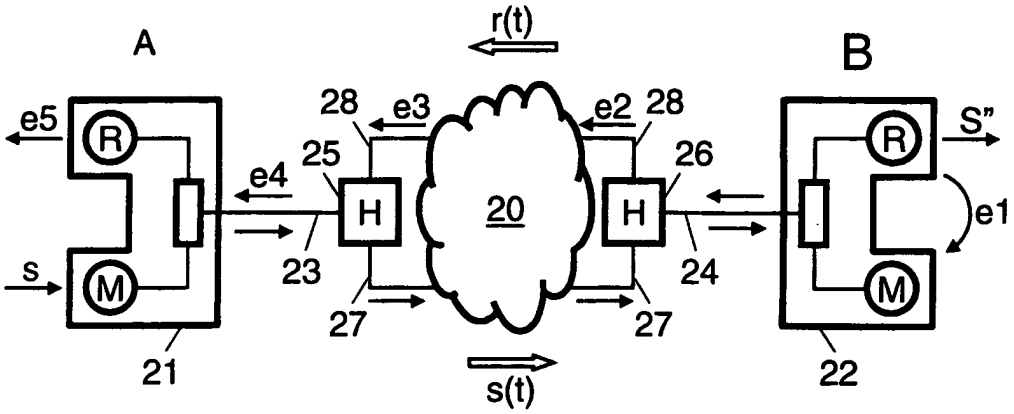

FIG. 2